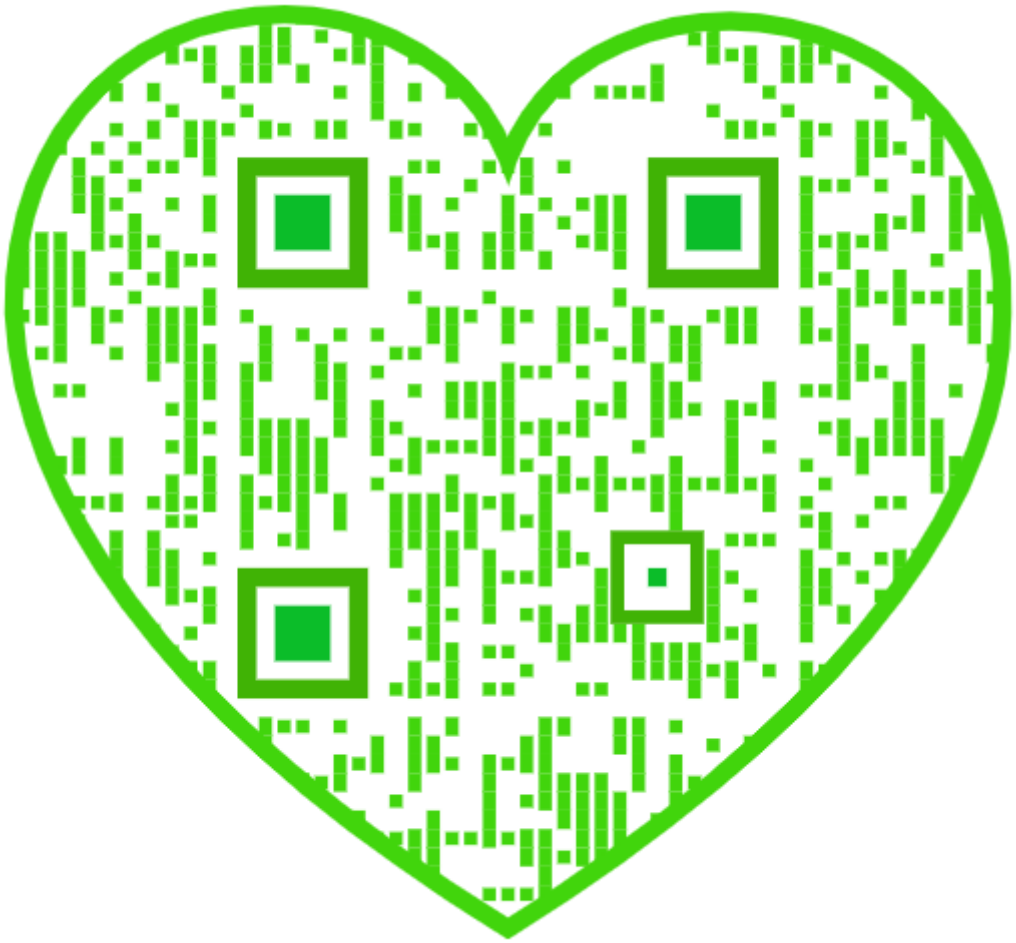

DEPARTMENT OF AGRICULTURE.

SPECIAL REPORT—No. 8.

THEA VIRIDIS,

OR

CHINESE TEA PLANT,

AND THE

PRACTICABILITY OF ITS CULTURE AND MANUFACTURE

IN

THE UNITED STATES.

ALSO SOME REMARKS

ON THE

CULTIVATION OF THE COFFEE PLANT.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1877.

DEPARTMENT OF AGRICULTURE.

SPECIAL REPORT—No. 3.

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ALSO SOME REMARKS

ON THE

CULTIVATION OF THE COFFEE PLANT.

INTRODUCTORY.

DEPARTMENT OF AGRICULTURE,
Washington, D. C., November 15, 1877.

An examination of the statistical tables of imports, compiled in the Treasury Department, shows that the people of the United States import annually from China and Japan about twenty millions of dollars' worth of tea.

This tea must be paid for in coin, and as the British merchants have secured nearly a monopoly of this trade, the annual drain of this large amount finds its way directly into the pockets of our friendly but astute rivals, whose merchant-fleets fill every harbor where a market may be had for their wares.

Believing that this large annual expenditure may be saved, and that with proper encouragement our people can export tea in successful competition with any other nation, I have caused to be prepared the following special report, by Mr. A. C. JONES, of this Department, who has endeavored to include some facts of practical value in relation to the history and culture of the tea-plant, not only in China and Japan, but, also, has collected, by correspondence and otherwise, so far as was possible in the limited time allowed, a history of all the tea-plants which have been successfully cultivated in various portions of the United States, mostly by persons having in view, merely, the possession of a rare exotic, rather than with any hope of profit.

As will be seen by reading the report and correspondence, the culture of the tea-plant in the United States is a success, so far as the growing of healthy and vigorous plants, and the preparation of small samples of tea here and there, can be called a success.

The wide difference between these sporadic efforts, which have resulted in the healthy growth of a few ornamental shrubs, and in the permanent establishment of a great industry which shall compete with the inherited dexterity and cheap labor of Asia, is fully realized and considered, and with a firm faith in the possibility of success I have determined to exercise whatever of power or influence shall be entrusted to this Department in the effort to demonstrate that, at least for our home supply of this necessary plant, we can and will be dependent only upon our own soil and agriculture.

This Department will, therefore, as fast as the limited means and ground at command will allow, procure seed and propagate plants, and distribute them to persons who will undertake to give such care and attention as may be required.

Special localities will be selected for this distribution, after careful consideration, having due regard to soil, climate, and surrounding circumstances, in which a number of persons will join, and each agree to inclose, plant, and

carefully cultivate a certain number of plants, sufficient in all to make it worth while to establish in the neighborhood at the proper time a tea-curing house.

The first attempts to establish this industry will be made in South Carolina and Georgia, in localities where the tea-plant has already been successfully grown.

Applications may be made, and correspondence is solicited with agricultural associations, which will undertake to carry out the plans and wishes of the Department, and plants will be furnished such associations from time to time, and as speedily as may be possible.

Meanwhile, to test the climate and soil of various untried localities, the tea-plants will be sent in small numbers to any part of the country where it is fairly probable success can be attained.

There are at present only about 2,000 tea-plants in the propagating beds of the Department, and these are engaged; but seeds have been and will be planted, which it is expected will produce several hundred thousand plants for distribution early next spring.

I appeal to those persons who realize the importance of the success of this attempt to establish a new industry, and to increase the prosperity of the whole country, as well as of the particular sections known to be well adapted to the culture of tea, for a deliberate, determined, persevering effort until success is attained.

WM. G. LE DUC,
Commissioner.

THE CHINESE TEA-PLANT.

As the practicability of the cultivation and manufacture of tea from the Chinese tea-plant in certain portions of the United States has been demonstrated by successful experiment, it becomes an object of interest to know its history, to learn the manner of its cultivation, and the method of its preparation.

Tea has been used in China for a period of more than a thousand years; yet the time of its discovery by the Chinese themselves is a matter of vague tradition only. An early writer claims that tea was known to the Greeks and Romans in the first century, but there is nothing in contemporaneous history to substantiate this claim. History is destitute, in fact, of any correct information of its use prior to the era of its introduction to the civilized world.

The Dutch East India Company first introduced it into Holland in the seventeenth century. In 1661 this company sent to the King of England two pounds and two ounces of tea as a rare and valuable offering, which was the first that was known of it in England. Six years later this company entered upon its traffic, and in a short time increased it to an industry of great magnitude, reaping from it rich profits and contributing through its importation large annual revenues to the British Government.

This enormous trade from the East Indies, inaugurated by the Dutch company, incited competition, which resulted in the formation of the British East India Company. At this time the English people were in the habit of using as the common beverage strong brewed ale, mead, and wines imported from France. In Virginia there had been discovered by the English colonists the bark of the root of the sassafras-tree, which was used by them in making an aromatic and pleasant drink, known as sassafras-tea, to which various virtues were attributed. Large quantities of this were imported into England about this time, and its use had become general. The East India Company, which embraced influential members of Parliament, to augment their traffic in Chinese teas, dictated laws placing heavy taxes on the home-brewed ales, and excluded oreign wines and sassafras by onerous import-duties. The early chroniclers of Virginia tell us that sassafras was in such esteem in England that its value went up to its weight in silver, and that it was smuggled into that country, in defiance of law and desperate penalties, through beams of timbers which were bored out hollow and filled with the coveted bark.

More than two centuries after the general adoption of tea, this product, destined to become essential to the people of every nation, and to constitute an important commodity in the commerce of the world, remained hidden from

our knowledge, and its culture and manufacture limited to the regions in which it is supposed to be indigenous.

For a long time the use of tea as a beverage was strenuously resisted in Europe on the ground of its deleterious effects on the human system, and that various maladies were induced and a number of diseases aggravated by it. Its importation, it was thought, would bring about manifold evils. But it was after a while generally conceded that it was less pernicious than various other stimulants, and, in fact, a positive benefit to mankind.

In 1810 the first seeds of this plant were introduced into Brazil, at Rio de Janeiro, and their cultivation undertaken at the botanic gardens of that capital. The better to secure the success of its cultivation in that country, and with a view also, of supplying the European markets several hundred Chinese immigrants were procured by the government, who were familiar with the whole process of training the plant and preparing the tea. This was, perhaps, the first colony of Celestials that ever settled in the New World. They did not prosper, however. They soon became discontented with their expatriation, and after a little while entirely disappeared. The government failed in its experiment, but the planters of the country took up the subject and prosecuted it to some extent successfully for domestic uses. Rich in so many other products, the country did not engage in its cultivation as an article of export.

In the island of Bourbon, in the Indian Ocean, there is used a tea called *Faham*, or *Orchid* tea, whence it was introduced into France. It is different in taste from the Chinese tea, and is highly esteemed, having a delicate aroma and tonic and digestive qualities. It is sometimes used in making an agreeable perfumery. This tea is also cultivated in the islands of St. Helena and Madeira.

They have a native tea in Arabia, prepared from the leaves of the *Catha edulis* (*Celastraceæ*), similar in taste and effects to the Chinese tea. It is a considerable article of commerce among the Arabs, and of general use with them as a common beverage. They use it also in chewing the leaves when in a green state to cause hilarity of spirits and to prevent sleep.

The inhabitants of the Malayan Islands have a beverage made from the leaves of a plant similar to the Arabian variety, and which grows upon high elevations and attains a great age.

In South Africa there is a tea called by the natives "bush tea," made from the leaves of a small bush of abundant growth, *Cyclopia genistoides*. It is of a medicinal character, and has the flavor and taste to a slight degree of the Chinese tea.

The United States naval Exploring Expedition in 1857, while exploring the sources of the Rio de la Plata, found the inhabitants of Paraguay addicted to the use of a beverage which they called maté, or Paraguay tea. The shrub from which it was made was believed to be indigenous, and the leaves when fresh resembled in taste the inferior Chinese teas. The inhabitants attributed to it almost fabulous virtues. The leaves of the plant were used by infusion simply; all classes of persons drinking it at their meals. Its effects were similar to opium, exciting the torpid and languid, calming the restless, and induc-

ing sleep. It was said to be in great favor as a beverage, not only in Paraguay and Uruguay, but in Peru, Chili, and Ecuador. The seeds of this shrub were brought home by the Expedition, but nothing is known of their propagation. Several plants of the maté tea procured more recently from Paraguay, known as *Ilex cassine*, *Yaupon*, are now grown in the conservatory of the Department of Agriculture. It belongs to the well-known Holly family, which grows in a wild state in some of the Middle and Southern States, and from which tradition says the Indians of Carolina were wont to make a black tea for use on occasions of peculiar ceremony.

The Chinese tea-plant described by botanists: *Thea viridis*, Linn.; *Camelia therifera*, Griff. (Chinese, *Chah;* Assamese, *Phalap.*) The ordinary height of the cultivated shrub is from three to six feet, though the wild plant attains a far greater size, sometimes fifteen or twenty feet. It is a polyandrous plant, of the natural order *Ternstromiaceæ*. The flowers, which open early in the spring, (appearing upon the plant about a month,) are smaller in size and much less elegant than those which render some species of the camelia so attractive. They are slightly odorous, and of a pure white color; they proceed from the axils of the branches, and stand on short foot-stalks, at the most two or three together, but usually solitary. There are five or six imbricate sepals or leaves supporting the blossom, which fall off after the flower has expanded, and leave from six to nine petals surrounding a great number of yellow stamens, that are joined together in such a manner at their bases as to form a sort of floral coronal. The seeds are inclosed in a smooth, hard capsule, of a flattish triangular shape, which is interiorly divided into two, three, and even five cells, each containing a firm, white, and somewhat oily nut, from the size of a pea to that of a hazel-nut, of a nauseous and bitter taste. They ripen in some localities as early as October; in others not until January. The stem is generally bushy, with numerous branches bearing a very dense foliage, and in its general appearance not unlike the myrtle, though not so symmetrical as that plant. The wood is light-colored, close-grained, of great comparative density, and when freshly cut or peeled gives off a strong smell resembling that of the black-currant bush. The leaves are alternate, on short, thick, channeled foot-stalks; coriaceous or leathery, but smooth and shining; of a dark-green color, and a longish elliptic form, with a blunt or notched point, and serrated except at the base. It is needless to mention that these leaves are the valuable part of the plant. They are, however, a good deal affected by the site in which the plant is grown, whether under the thick umbrage of large trees or in open space exposed to the influence of the sun's rays, as well as by the nature of the soil in which the plant is found.

The tea in its wild state can hardly be called a *plant*, but a *tree*, with a trunk eight to ten inches in diameter, and reaching in some instances to a height of twenty or thirty feet.

Although many varieties of tea are known in commerce, they are not the products of as many species of the tea-plant. Mr. A. Smith says, in the Treasury of Botany, "A few modern botanists combine the two well-known genera, *Thea* and *Camellia*, adopting for the genus the name *Camellia*, which

is the oldest of the two; but as they have from the time of Linnæus downward been regarded by the majority as distinct, we shall here consider them so, more especially, too, as improved and better marked characters for their distinction have lately been pointed out."

While authorities differ somewhat on this subject, the most correct information leads to the conclusion that "black" and "green" teas are made from each of the two species named, the difference in the article produced depending upon the period of gathering, qualities of soil, and the process of manufacture.

The principal tea-districts of China, which supply the greater portion of teas exported to Europe and America, lie between latitudes 25° and 35° north; the finest districts between 26° and 35°, and between 110° and 120° east of Greenwich. The districts of Assam, in India, in which tea is cultivated, lie between the 26th and 32d degrees of north latitude, and the 75th and 95th degrees of east longitude, which districts embrace a soil varied in surface, elevation, and composition, and a climate tropical, semi-tropical, and temperate.

The tea-plant is not only cultivated in China, and the territories of India adjoining, but in Japan, Corea, and Java, and for the last forty years, to some extent, as before mentioned, in Brazil.

The tea-plantations in China and Japan are always situated on the lower and most fertile sides of the hills, and rarely on the low lands. The plant thrives best when it enjoys a southern exposure to the sun, though it endures considerable variations of dryness and moisture, and of heat and cold. A rich sandy loam is the best soil for its growth, and in the vicinity of small streams of water.

The shrubs are planted in rows, about four feet apart, and about the same between each row, and at a distance look like shrubberies of evergreens. The plants are raised from nuts or seeds, and usually sown where they are to remain. Three or four are dropped into a hole, and covered with earth two or three inches deep; these come up without any further trouble, and require little culture, except that of removing weeds. In the early stages of the growth of the plant, shading is undoubtedly advantageous, as the roots are sensitive to the heat of the sun. This is done by sticking about them pine branches and ferns. After the first year they supply their own shade.

It is necessary, also, occasionally to prune the plants. The first year the top of the plant should be nipped off, to arrest its upward and promote its lateral growth. In the second year the plant ought to be trimmed so as to give it a conical shape, and the straggling branches to be cut away. From time to time in each year the plants should be reduced by judicious trimming to orderly shape and size.

The leaves are not collected from the cultivated plants until they are three years old, and after growing nine or ten years they are cut down in order that the young shoots, which will then rise, may afford a greater supply of leaves. The tea is gathered while the leaves are small, young, and juicy. The first collection of tender leaves makes the best variety of tea. The process of gathering tea is one of great nicety and importance. Women and children

are the best adapted for this work. Each leaf is plucked separately from the twig. The hands of the gatherer are kept clean for this purpose. The Chinese dislike gathering tea on a rainy day, and claim, even, that they can distinguish the teas made on a rainy day from those made on a sunny day.

The yield of a tea-plantation is about one pound of tea to the plant.

There is some degree of art necessary in plucking, so as not to interfere with the growth of the young leaves. The pluckers are divided into gangs, and the leaves kept separate for classification of the teas. As soon as gathered, the leaves are taken to the tea-house, weighed, and prepared for use.

The process of preparation or manufacture is given in a work on the subject by Spencer Bonsall, esq., whose studies and observations on tea-culture make him, perhaps, of the best authority. This writer states that the leaves are thinly scattered on shallow open-work bamboo trays or baskets. These are about three feet in diameter and two in depth. They are then placed on a light frame-work of bamboo, and exposed to the sun and air for two or three hours, depending on the heat of the sun, or until somewhat soft and wilted. This effected, they are removed to the tea-house and placed on open shelves, where they are allowed to remain about half an hour to cool, after which they are put into smaller trays, which are placed on tables and the leaves beaten. This is performed by gently clapping the leaves between the hands, tossing them up and letting them fall, for about five or ten minutes. They are then replaced on the shelves for half an hour and again brought down and clapped as before. This is done three times in succession, which causes them to become soft and pliable and of a brown color. During the operation of beating, the leaves give off a strong and peculiar aroma, at each time different, so that a person acquainted with it can tell at once whether it is the first, second, or third process the leaves are undergoing, the moment he enters the tea-house.

Experience has shown that without this process of beating, the tea, when made, would have a strong, herby taste, and would not become sufficiently black. The leaves are now ready for the pan. This is made of cast iron, very thin, about two feet six inches in diameter, and six inches deep in the center. It is placed at an angle of about thirty degrees in a brick fire-place three feet high at the front edge; it is well heated by a quick fire of light wood. About two pounds of the leaves are spread in the pan, where they make a cracking and fizzing noise like frying meat. They are rapidly turned with the hands so as to prevent them from scorching. This process is called *tatching*. As soon as the leaves becomes hot, they are quickly brushed out on a *doliah*, or close-worked bamboo tray, which is held ready to receive them. A brisk fire is constantly kept up under the pan.

After using the pan in this manner three or four times it becomes foul from the juice of the leaves sticking to it, rendering it necessary to scour it out.

The hot leaves are immediately given to men standing at a table, each with a tray before him, on which the leaves are rolled. This is done by collecting them into a ball, which is grasped by the left hand, with the fingers close together and the thumb extended, the hand resting on the little finger; the right hand extended in the same manner, but placed on the top of the ball.

Both hands are employed to roll and propel the ball, the left hand keeping it in shape and allowing it to revolve, and the right hand pushing it along with as much force as possible to express the juice from the leaves. The art lies in giving the ball a kind of circular motion by pushing it in a curve toward the left, and causing it to revolve two or three times before the arms are extended to their full length, and then drawing it back quickly without leaving a leaf behind. It is rolled in this manner for about five minutes, occasionally opening the ball gently with the fingers, lifting it up and letting it fall, for the purpose of separating the leaves, which are again collected in the center of the tray by giving it a circular toss or shake.

The leaves are now returned to the pan to be *tatched*, or heated, as before. The bare hand must always be used in the pan, to enable the operator to judge of the heat, or the leaves may be scorched. Again they are rolled as before, and should they not have sufficient twist, which may be known by a little practice, they must be heated and rolled a third time. This being effected, they are placed in the drying-basket. This is two feet six inches in height, and two feet in diameter at the top and bottom; one foot from the top the diameter is eighteen inches. At this place rests a small sieve of bamboo, on which the tea is put; the interior of the basket is lined with paper, the better to retain the heat. The leaves are thinly scattered on the sieve, not more than one or two inches in depth, and the whole placed over a charcoal-fire, which must be carefully regulated, so as not to allow the least smoke. The charcoal should be in small pieces and the fire fanned until the whole gets well ignited; stirring it occasionally and bringing the coals to the center, leaving the outer edge depressed.

Care should be taken that none of the leaves fall through the sieve into the fire, as the smoke will spoil the tea. A slap or two given to the basket before placing it over the fire will prevent this by causing the loose leaves to fall. The baskets are occasionally taken off the fire and placed on a large tray, which is placed on a stand, and the leaves turned over. After they become half dry, and still soft, they are taken off the fire and put on large trays, which are then placed on shelves, where they are allowed to remain several hours, or until the next day, in order that the color of the tea may improve. After this, it is sorted into three or four different sizes, first by passing through neatly-made sieves, and then carefully picked over. All the red and untwisted leaves are thrown aside as useless, or retained until the end of the season, to be worked over into inferior teas. After this separation, it is very thinly scattered on the sieves in the drying-baskets, keeping each kind separate. The baskets must be taken off frequently, placed on the large tray, and the leaves turned, care being taken as before that none of them fall into the fire. In fact, the tea should never be touched while over the fire; the baskets must always be removed for this purpose.

As soon as the tea becomes dry and crisp it is taken out and thrown into a large receiving-basket, where it remains until the whole quantity on hand becomes alike dry and crisp. The fire must now be deadened by sprinkling ashes over it to make the heat more gentle. Large quantities of the tea are now put into the drying-basket to the depth of eight or ten inches, leaving a

passage in the center for the heat to ascend; the leaves which have fallen through the sieve on the tray must be placed on the top of all, and the basket put over the fire with the greatest possible care, a tray being laid over it to retain the heat. The basket is lifted off from time to time, placed on the tray, and the hands, with the fingers apart, run down the sides to the sieve, and the tea gently turned over, the passage again made in the center, and the basket replaced over the fire. When the leaves become quite crisp, so as to break easily with the slightest pressure of the fingers, the tea is finished and ready for packing.

It is best to pack the tea while warm, taking care also that the box is perfectly dry.

A chemical examination of Chinese and Japanese teas shows that when well dried they still contain from 5 to 6 per cent. of moisture.

The evaporation of water from the leaf, and the drying process, changes its color to dark brown or black.

The aroma or flavor of the tea-leaf, so marked when well prepared, does not exist in the plant during life, but is the result of the judicious application of heat, which develops an essential oil from the resinous matter of the leaf. Great care is necessary in the drying process to properly obtain and preserve this flavor.

The teas are named from the locality or country where they are produced, and from the size and age of the leaf. These again are divided into classes and names.

Learned medical authorities say that tea derives its beneficial qualities, not from its direct supply of nutrition, but from its affording a peculiar substance called *theine*, the effect of which in the system is to diminish the waste, thus making less food necessary. Tea, it may be stated, thus has a positive economic value, not as supplying but as saving nutriment.

It is estimated that about four pounds of green leaves will make one pound of prepared tea, and that an acre of ground will produce four hundred and fifty pounds of tea.

The finest teas made in China and Japan are sold in those countries at from $5 to $14 per pound.

There is some conflict in the authorities in regard to "black" and "green" teas. While some assert that they are different species, with permanent characteristics, others maintain, and the weight of authority is decidedly in favor of the latter, that the color is made by art, and that the green teas are dyed by a preparation of Prussian blue and gypsum.

The Chinese never use the dyed teas themselves. They are made for the foreign market. The teas prepared from the fresh young leaves of the first plucking are there denominated "green" teas, but they are not the "green" teas known to commerce.

A traveler in China wrote, in reference to fresh tea: "We drank some green tea in less than thirty-six hours from the time the leaves were plucked from the plant. There is hardly anything so delicious as fresh green tea drank, as the Chinese always drink it, without sugar or milk. You must come to China if you wish to taste this luxury, for all green tea loses much of its flavor

by being kept, and the finest kinds will not bear to be transported across the ocean."

The reports of United States customs show that the importations of teas from China and Japan, free of duty, aggregate from nineteen to twenty millions of dollars per annum.

With the view of showing the practical bearing which this subject has on the agricultural interests of the United States, it is gratifyiug to know that large portions of our territory present, with respect to climate and soil, and corresponding degrees of latitude and other circumstances, a way open to the introduction and culture of tea, and an enterprise among its people, it is believed, sufficient to lead to its extensive manufacture.

As to its expediency it is only to be stated that millions of dollars will thus be saved for its annual importation. The United States can at least compete with China and Japan for its local consumption if they cannot rival them in supplying foreign markets.

The latitudes in which tea is successfully cultivated in China, Assam, and Japan correspond geographically with the latitudes embraced in the States of Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Alabama, Tennessee, Kentucky, Arkansas, Missouri, and a portion of the Pacific coast, and the conditions of temperature, soil, &c., are about the same. Wilmington, in Delaware, is parallel with Peking, one of the finest tea-growing districts in China. And the upper portions of South Carolina are parallel with three of the most abundant of its tea-growing provinces. So with the other States mentioned.

The successful experiments in its culture already made in several of the States above mentioned, an account of which is given below, amply justifies the opinion that it can be made an industry in this country of great advantage and profit.

A little calculation will show the profits which may be derived from an acre of 2,000 tea-plants three years old. The third year the yield should be 187 pounds, the fourth year 312 pounds, the fifth year 500 pounds, and the sixth year 750 pounds, per acre. When the leaves are abundant one person can gather 16 pounds per day, but the average result of a day's work will not exceed 10 to 12 pounds. The leaves are gathered at three different periods, running from March to September. And on an acre yielding 500 pounds the first picking would be about 120 pounds, and could be gathered by four persons in two days; and the same number could pick the other two crops in three days.

These pickings coming at a season not to interfere with other crops, any more than the small fruit of a farm-garden, any family of four persons can easily cultivate a single acre, and can take care of it with little more work than is often given to pickling and preserving. And as in the domestic or family pickling and preserving it is not claimed that the pickles and preserves are made in small quantities at as low prices as it can be afforded by factories specially devoted to such industry, yet the superiority of the article produced is generally vastly in favor of the family production. So the teas made in small gardens by the surplus family labor has the advantage of superiority

and classification, or separation of grades, not now known to the imported article. Besides, this labor, limited to the small garden, would not be taken from that needed in the general work of the farm or plantation, but would be a mere recreation, by being a change and new variety of occupation.

To grow tea as a business by itself, and in competition with the cheap labor of the Chinese, would be an experiment in this country, especially as regards the coarser article. As the finer teas rarely leave China, and the finest never, there would be no competition as to these grades, if the manipulation of the leaves is carefully and skillfully attended to.

The possibility that the tea-leaf may be cured and prepared by modern means and appliances, rather than by firing and hand-rolling, would seem to promise sufficiently well to induce the necessary experiments; for, if successful, the expensive part of preparing would be done away with, and, as an industry, tea-producing would be placed in comparative advance, as was cotton by the gin, and sugar by the centrifugal pan. But whether or not, as a special crop, tea can become an industry among us, it is plain that there are thousands of families in at least one-third of our land that may profitably grow a tea-garden, and can enjoy it as they do the orchard or the berry-patch, and have the agreeable experience of drinking a beverage never yet known in this country, from a grade of tea worth in China and Japan from $5 to $14 per pound.

The cultivation of this plant in a small way would in addition soon build up one or more manufactories in the vicinity, which would become a market for the uncured leaves, as cheese-factories in many of the Northern States become the markets for all the milk within reach, whether the individual production be in large or small quantities.

The average price of tea, as imported into this country, does not exceed 30 cents per pound, though the retail price is nearly twice that amount, and the average of this tea in China is not one-twentieth the value of the fine teas that are never exported.

Take, then, your tea-garden of one acre, of 2,000 plants five years old, and, if fairly attended to, you should have—

One acre of ground, worth	$50 00
2,000 plants at 10 cents	200 00
Planting and cultivation	250 00
Interest at 10 per cent. for five years	250 00
Investment at time of full crop	750 00
Harvesting crop:	
Cost of picking	$96 00
Curing by hand	32 00
Packing	9 00
Incidentals, tools, &c	12 00
	149 00
Interest on investment at 6 per cent	45 00
	194 00
Per contra:	
450 pounds of tea, worth on an average 75 cents	$337 50
Profit on crop of fifth year	143 50

This is taking no account of the crops of the third and fourth years, which would be 188 and 312 pounds respectively, or in the aggregate 500 pounds.

Let us consider the third and fourth years' crops.

The tea-garden would cost the same for grounds, plants, setting, and cultivating as before, *i. e.*, $500; but the interest should only be taken for the three years, which, counted at the rate of 10 per cent. on an investment made so long before yielding, and the interest thereafter at 6 per cent. as an annual interest, we shall find the cost of the tea-garden to be—

One acre plants, three years old	$500 00
Interest at 10 per cent., three years	150 00
Interest at 6 per cent., two years	60 00
Total cost at five years	710 00
Per contra:	
Crop of 188 pounds on third year, profit	$75 20
Crop of 312 pounds on fourth year, profit	130 40
Crop of 450 pounds on fifth year, profit	202 50
	408 10

Deducting the income from these crops from the total cost of the tea-garden at the end of five years, and we find that whatever may be the actual or estimated value, the outstanding cost to the owner, including the value of the land, interest, &c., is net only $301.90 for a tea-garden capable of a profit of more than two hundred dollars per annum thereafter, which is equal to an income on a capital of $2,000 at 10 per cent., or of a capital of $3,300 at the rate of 6 per cent. And yet at this period of its existence it is not in full bearing; hence the showing made as above is not exaggerated, but is in reality less than can be fairly counted on. So that, if the teas were graded with care, this tea-garden of one acre should give a profit, after five years, over interest and fair labor and charges, of $250 annually.

EXTRACTS FROM LETTERS FROM CULTIVATORS OF THE TEA-PLANT IN THE UNITED STATES.

Mr. Thomas M. Cox, Greenville, S. C., says:

Dr. Junius Smith was probably the first person who introduced the tea-plant into South Carolina. He was, I think, a native of Massachusetts, and had a daughter married to a gentleman connected with the English naval service, and resided with her in the East Indies. From them he received the seed, and probably some of the plants. He was very successful, but is now deceased, and his plants, without protection, were lost. I obtained, in 1857 or 1858, from the Patent Office, a box of tea-plants. I gave the most of them away, and retained a few myself. They have grown well without any protection, in the open air, and have attained a height of 8 or 10 feet. They have frequently matured the seed, and there are a number of the seed on the ground at this time. They are an evergreen in this climate, and are now in flower, with the seed of the last year's growth fully matured upon the bush. I have never succeeded in making tea from the leaves, not knowing the process of manipulating them.

Mr. J. J. Lucas, Society Hill, S. C., says:

The tea-plant has been grown successfully in this State, Georgia, and Louisiana. Dr. Junius Smith, late of Greenville, S. C., planted it more extensively than any one else in this State, but concluded that labor was too costly to make the culture profitable. Dr. Thomas Smith, of this place, and General Gillespie, of Cheraw, obtained a few plants about the same time that Dr. Junius Smith did, but did not attempt to make tea. General Gillespie's plants are still living and thriving. On the Middleton place, Ashley River, near Charleston, tea-plants are now growing, for ornamental use only, and are 10 feet high. A gentleman in Georgia (says the Rural Carolinian) obtained 441 pounds of tea from one acre of land, which, at 50 cents a pound, would bring $220.50. Our average cotton-yield is about $15 per acre; our best, about $40.

It is recommended to plant 5 by 5 feet, or 1,764 plants to the acre. Mrs. R. J. Screven, of Liberty County, Georgia, says the tea-plant thrives as high up as Athens, and is more liable to injury from heat than cold. The editor of the Soil of the South, New Orleans, succeeded so well that he was offered $1.50 per pound for his make of tea. Cotton is now, in price, below the cost of production, and we must try something else.

Dr. Turner Wilson, Windsor, N. C., says:

I send you a package of green tea-leaves, blossoms, and a few seed in the capsules. I have no person that understands curing the leaves, but will send a package of the dried leaves, as I term them. I frequently drink a simple infusion of the leaves dried in the shade (in the attic), and though not so good as the Chinese preparation, yet I know that I am drinking the *pure* tea, without any coloring-matter like plaster of Paris or prussiate of iron.

I have been raising the tea since 1858, but without much cultivation. My yard and garden are sandy soil, and the plants or bushes, without any cultivation, are of slow growth. I plant the seed about the 1st of April, but they come up under the bushes very thick from the fallen seed. Sometimes I throw a little dirt on the seed which I do not pick up. I have several hundred plants under the bushes, from 4 to 12 inches high, and about fifty in my front yard. I have never sold any seeds or plants, but could do so. I have distributed them from Maryland to Texas in small quantities. The leaves may be picked in May, July, and September.

The last any time before frost. The cost of picking would be a mere trifle, as one hand could pick two or three bushels a day.

The curing of the leaves should be done in copper pans of different degrees of heat; but as none of my family, except myself, drink tea, I put up with the inferior curing in iron pots and ovens, or stove-pans. Dry in the shade, and pack tight in boxes or jars. The young tender leaves no doubt make the finest green teas; the old, full-grown, and refuse leaves, the black tea.

James. H. Rion, Esq., Winnsboro, S. C., says:

I have no experience in the making of tea, but can certify to the adaptability of the soil and climate of my section to the growth of the plant itself. I live in Fairfield County, which is a little north of the center of the State. In the fall of 1859 I received from the Patent Office, Washington (of which the Agricultural Department is a part successor), a very tiny tea-plant, which I placed in my flower-garden as a curiosity. It has grown well, has always been free from any disease, has had full out-door exposure, and attained its present height (5 feet 8 inches) in the year 1865. Since then it has been occasionally trimmed. The bush is like a ball resting on the ground, its breadth being equal to its height. It is continually producing perfect seeds, which readily germinate and produce healthy seedlings. The seeds are the size of small filberts. This shows that the plant finds itself entirely *at home* where it is growing. There cannot be the least doubt but that the tea-plant will flourish in South Carolina.

Mr. H. B. Holliday, Valdosta, Ga., says:

We have but two tea-plants, which have done well. They were brought to this place by Samuel Varnadoe, now deceased, from Liberty County, Georgia. William Jones and Mrs. Rosa Screven, of Liberty County, are now raising tea, and I have just been told that it does well. Their post-office is Dorchester, Liberty County, Ga., via No. 2 Atlantic and Gulf Railroad.

Mr. W. M. Ives, Jr., Lake City, Fla., says:

The seeds of the tea-plant were obtained from the Patent Office about the year 1858. The plants can be propagated either from seeds or slips. It is an evergreen shrub. I think five years from seed, or three years from slips, would be as early as a crop of leaves could be taken. After that the crop would increase annually.

Its cultivation might be made profitable, but our people do not pay enough attention to such objects as promise returns in future years. The method of drying the leaves is a very simple process. Many families already possess a number of tea-plants, but they grow them simply for their beauty and novelty. Tea can be grown in Georgia as well as in Florida. We should grow our own tea, but we do not, and will not, unless something is done to promote an interest in the matter.

Mr. James S. Murdock, Charleston, S. C., says:

I would also mention that the tea-plant is well suited to our climate. A gentleman at Georgetown, on our coast, writes me that he has raised a large number of plants from the seed, and they are as thrifty and grow as well as our wild orange, the cold weather, which we have occasionally, producing no effect on them.

Dr. A. W. Thornton, Portland, Oreg., says:

Some years ago a capitalist, Mr. Samuel Brannan, started the cultivation of tea at Calistoga, in Napa County, California, but through some mismanagement at the outset the crop did not succeed. And as at that time capitalists could make their 3 per cent. a month in other enterprises, Mr. Brannan saw no money in it, and abandoned the enterprise. But to this day solitary plants can be seen in that locality, exhibiting vigorous growth, proving the suitability of both soil and climate. Since that time a gentleman (name forgotten) started a plantation of tea at Modesto, in the foot-hills of the Sierra Nevada Mountains, Stanislaus County, California, in which the plants have done so well that from the last accounts he was so far encouraged as

to extend his plantation; but as yet I have not heard of it as coming into the market as a finished article of commerce.

With regard to Oregon and Washington Territory, I am not aware that the experiment has been tried yet, although there are localities in Southern Oregon, about Jackson County and the Rogue River country, and perhaps east of the Cascade range, where the summers are warmer and the winters are colder and drier, in which the plant would flourish, though subject to a ground freeze in winter. In the Willamette Valley the *Wistaria sinensis* does well in the open air, but *Fuchsias* and *Salvia splendens* require to be taken into shelter in winter.

That the tea-plant is admirably suited to Northern California and Southern Oregon I have no question; more especially as the light on this coast is so abundantly charged with actinic rays, as shown by the richness of the foliage and gorgeous tints of the fruits and autumnal foliage, supports the view that any plant, the active principle of which is located in the leaves, would *prima facie* yield a richer product where actinic rays are abundant (which are known to have an important influence upon chlorophyl and leaf-development) than in less favored climes.

That the moisture of Northern Oregon and Washington Territory might give a rankness to the leaf development inimical to the plant as a commercial product can only be proved by experiment, and, if so, might be sufficiently modified by a system of pinching back in summer and not pruning in winter or fall.

I have not been sufficiently long in Oregon to form an opinion of the winters from actua experiment; and the hearsay opinions of others are of very little value with respect to any special inquiry, the subject-matter of which they are unacquainted with, unless, indeed, they happen to be men of scientific education, capable of appreciating the value and influence of natural laws so far as at present developed.

Mr. ARTHUR P. FORD, Charleston, S. C., says:

About four or five years ago I obtained from a friend some seeds of the tea-plant, and planted them in my garden, twenty-one miles from Charleston, inland. The plants came up readily, were duly transplanted, and are now fine shrubs three feet high, and seven in number. The foliage is luxuriant; and the plants bear the coldest weather here without any ill effects; the mercury on more than one occasion marking 16°; and the plants being encased in ice at other times also.

Owing to my unavoidable absence during the past two summers, I have been unable to gather and prepare the leaves.

I am satisfied that both tea and coffee plants would succeed in the South, and it would be well if our planters could be induced to experiment with both.

WILLIAM SUMMER, Esq., Newberry County, South Carolina, says:

There are several healthy, vigorous tea-plants growing in Columbia; these plants have been cut back to keep them in proper condition in the grounds where planted. I have seen at the Greenville residence of the late Hon. J. R. Poinsett the tea-plants growing finely, of those introduced by Dr. Junius Smith. And he remarked to me that we have here the *Olea fragran* (fragrant olive), with which we can flavor the tea equal to any prepared for the special use of the Emperor of China. The fragrant olive blooms freely from early spring until midwinter, and the flowers, when gathered fresh and put in the caddy among the tea, impart a delightful aroma to the tea. I have at different times imported a few tea-plants from Angers, France, and these have been disseminated from the Pomaria nurseries, and found to succeed. I have no doubt of the success of the tea-plant in the middle and upper portions of this State.

Col. S. D. MORGAN, Nashville, Tenn., says:

Of all the plants for the South Atlantic States, that of the Chinese or Japanese tea promises most success. Before the war I had a few of the shrubs growing in a small parterre attached to my town dwelling, from which I obtained leaves as rich in aroma and "*theine*" as is to be found in tea from any country whatever.

The shrub grows luxuriantly in central Georgia—even 100 miles north of Augusta, to my

personal knowledge—as I there used the domestic article for several weeks' time and found it excellent. There may, however, be a difficulty about its culture, for want of a very cheap class of laborers to pick and prepare the leaves. This, however, is a subject I have not investigated, but I think it is worthy of a thorough investigation.

Mrs. Mary J. Ives, Lake City, Fla., says:

Your letter making inquiries in regard to the tea-plant has been received.

My husband obtained the plants, through a friend, from the Department of Agriculture at Washington, in the year 1858. They were then small plants, only a few inches in height. Now they are large shrubs.

I have used the leaves for making tea, and those who have tasted it have pronounced it of a very fine flavor. Am sorry that I have none on hand at present, that I might send you a sample.

The plant is not at all affected by cold weather, such as we have in this climate, blooms and bears seeds, and can be propagated by cuttings as well as by the seed. By this mail I send you some seed.

Miss M. C. McFall, High Shoals, Anderson County, South Carolina, says:

I take pleasure in informing you that I have a tea-plant which I have had fifteen years, and which was sent me by Col. J. D. Ashmore while he was in Congress. It has remained in the center of the garden where it was originally planted, and has had no care or cultivation. Fifty plants, I suppose, could have been reset from the young seedlings sprung up beneath it from the fallen seeds, but I was afraid to disturb them. This year I have cured some of the leaves, and will send you a sample. I have had no one to show me how to prepare them. I have given away five pounds of the tea, and have been using it in the family all the year. The plant is an evergreen, and stands the winters perfectly well. It is 8 feet in height, 4 feet in diameter, and never has been pruned or trimmed.

Mr. Alex. M. Forster, Georgetown, S. C., says:

In reply to your letter received through Mr. Murdock, I will give you what little experience I have had with the tea-plant in this low country of South Carolina.

The original plant I brought from Columbia, S. C. It is a genuine *Thea viridis*, from seed, I think, produced from the tea-plants brought to this State some years since by Dr. Junius Smith, and cultivated near Greenville. After my plant had attained the height of two or three feet, it began to bear flowers and seed. From these seeds, or nuts, I have now 50 or 60 plants of various sizes; some of them bearing fruit also. I might have had 500 plants as well as 50, so easily are they propagated, and so abundantly do they bear seed. The only care necessary is to preserve the tap-root as carefully as may be, in removing the young plants from the nursery bed. My plants are in a rich, dry soil, and grow very rapidly, requiring only three or four years to reach the height of 4 feet. They are as thrifty and bear the vicissitudes of our climate as well as the native Cassina (*Ilex cassene*). I have several times picked (in April) a quantity of the young leaves, and commenced the process of curing them according to the directions given by Mr. Fortune (see Agricultural Reports, 1853), but I have never had the perseverance to carry out fully the entire process, as it occupies hours to complete it, and requires the patience of a Chinaman; yet I have made some fair black tea, better than much that is said to have come from China and for which I have paid $1.25 per pound.

The Chinese method of curing tea is impossible in this country, where we cannot obtain labor at 5 to 10 cents per day; yet some equivalent to this process is necessary to the production of tea, such as we drink it, for a decoction of the tea-leaves dried without this manipulation has little resemblance to the beverage we all so much appreciate. I am convinced that the slow rolling and pressing at certain intervals, and then the heating and rolling over and over before the final drying, are required to break the sap-vessels in the leaves, in order to produce in the juices, by contact with the air, a certain degree of fermentation necessary to bring out the flavor or develop the properties we find in the Chinese preparation. If there could be invented some machine to imitate this hand-labor, to effect the same slow process by means less expensive than the human hand, I think that the cultivation of tea might become not only practicable, but profitable in a large portion of our Southern country.

Rev. W. A. MERIWETHER, Columbia, S. C., says:

I obtained a Chinese tea-plant from North Carolina nine years ago, and set it out in open ground in a plat of Bermuda grass. It has received no cultivation, and is now a fine shrub, measuring to-day six and a half feet in height by nine feet across the branches at the base. The soil where it grows is light, sandy land, with no clay within two feet of the surface.

The plant is not affected by the severest cold to which our climate is subject. It was not the least injured by the intense cold of December, 1870, when my thermometer registered 1° above zero; the coldest weather I have ever known in this latitude.

My plant blooms from the latter part of August on to December, and makes a beautiful ornamental shrub. It is ever green. I have obtained tea of the best quality from the cured leaves. The process of preparing the leaves for use is the same as that given in the Southern Cultivator, January number, 1872. There have been successful experiments made with this plant in Florida and in Georgia. That the climate of the Southern States is well suited to the cultivation of the tea-plant I think there can be no question. I sincerely hope you may succeed in your efforts to arouse our people to the importance of its cultivation. If only enough tea were made to supply the home demand, what an immense annual saving would result!

Hon. JAMES EDWARD CALHOUN, Trotter's Shoals, Savannah River, S. C., says:

At my last visit to Rio de Janeiro, a treatise on tea-culture, written in Portuguese, was presented me by the author, the priest-superintendent of the Imperial Botanic Garden.

On my return I was traveling in company with the governor toward Greenville District, when the death of Junius Smith was rumored. I urged the governor to deflect from his route to inspect the tea-plants, and, if it might be, in his official capacity to assume the carrying out the experiment instituted by Mr. Smith, promising, in such case, to make a translation of the treatise and send it to him. No steps, however, were taken in that direction. In acknowledging your communication, I renewed the promise to make the translation for your Department. A prolonged, unsuccessful search among my papers for the treatise has been one cause of the delay of my answer.

Few words will suffice to detail my experience. Eighteen years ago some half-dozen tea-plants, brought from China, were sent me. I set them in what had been a strawberry-bed, in a soil friable, of medium quality, unmanured. The war and its consequences supervening, I have contented myself with merely securing a supply of tea for my household. Nothing has been done beyond keeping down the weeds with the hoe. The plants have had no protection; but during a portion of the first summer, seedlings have some shelter. As yet there has been no damage from blight or from insects. Frequently leaves are clipped in moderation from all parts of the bush, care being taken not to denude. They are parched in an iron vessel at the kitchen fire, constantly stirred, and immediately afterward packed in air-tight boxes. To prepare them for infusion, they are ground in a coffee-mill. I inclose leaves plucked to-day, measuring from 3½ to 5 inches, and, as you will perceive, exhibiting three varieties.

The capsules of the tea-nuts afford the most pleasant of bitters. They were saved and given to the matron, an item in her *materia medica* for my people, long before I heard that a physician in Georgia had carefully tested the "tea-hull," and found it to possess all the properties of the cinchona.

The plants have buds, blooms, and fruit. As the latter drop, a portion are planted. The remainder are kept in brown sugar, and reserved for planting in mid-winter. They are ornamental and marvelously fecund.

At the axil of every leaf there is a bud; often two, sometimes three buds. They would be invaluable to the apiarian.

On the 12th of November frost stopped the blooming of cotton, but swarms of the honey-bee continued to visit the fresh blossoms of the tea-plants. Bumble-bees and yellow-jackets also present themselves. The latter, feeding differently from the others, fall to the ground gorged.

This is the perfect climate for the tea-plant.

Mr. S. I. JONES, Thomasville, Ga., says:

Your favor relative to the tea, its cultivation and preparation, has been received. Inclosed please find an article written by my sister, Mrs. Screven, of Liberty County, Georgia, who has had some experience in tea-making, and has plants for sale. I have several hundred plants on my farm near this place, and from which I make a good article for home use. I soon hope to have five acres set out. I prepare the tea similarly to Mrs. Screven.

Mrs. R. J. SCREVEN, McIntosh, Liberty county, Ga., says:

In response to your request for an account of the tea-plant, and also of the process of preparing the leaves, I herewith give you my experience. Mr. Robert Fortune, in his "Two Visits to China," says: "The soil in which the tea-plant does best is moderately rich; that is, it contains a considerable amount of vegetable matter, mixed with clay, sand, and particles of rock." My experience is that it does best in land somewhat low, but not such as water will lie upon or is overflowed. I sow the seed in the fall, as soon as they ripen and drop from the bushes, in drills eighteen inches apart. They come up readily in the spring, and by winter are from three to six inches high. Under the shade of some large tree is usually the place selected for sowing the seed, for if the plants are exposed to the hot sun while young, they invariably die the first summer. When six months old they are ready for transplanting; have generally a good supply of roots, and can be set out any time from the first of November to the last of March. In putting them out, I have generally prepared holes to receive them, to give a good start, so that fine, healthy bushes will be obtained.

The holes are usually dug out a foot or more deep, and equally as wide, and filled in with half-rotted leaves, a little cow-pen manure and surface soil; all of this to be packed down to prevent water settling around the plants whenever it rains. The tea is planted up to its first leaves, and a little water given to press the earth close to the roots. As soon as the warm spring weather begins, each plant is shaded from the sun. A crutch, two feet out of the ground, is driven in on each side of the plant, a strong stick placed across the crutches, and pine branches leaning upon this make a cheap and good shade.

The tea, when young and not large enough to shade its own roots, is very sensitive to the heat of the sun. This shading being somewhat troublesome, I have adopted another plan. It is this: to set out the plants under the shade of some large bush or tree until they are about two feet high, then take them up carefully, cut off nearly all the tops, and plant out in their permanent places. As soon as spring opens they will put out sufficient leaves to shade their own roots. In April, 1867, I think it was, Mr. Howard, from Baltimore, who has been engaged on a plantation for several years in the East, visited my father's plantation in this county. He expressed himself as surprised at the splendid growth of the tea. Being there at the time of gathering the young leaves, he plucked from one bush alone, prepared the tea himself, and took it on to Baltimore, where he had it tested and weighed. He wrote back that it had been pronounced stronger and of superior flavor to the imported, and that by calculation he was satisfied that four hundred and fifty pounds of cured tea could be made here at the South to one acre of ground.

Mr. Fortune, in writing of the tea-growing districts of China, states that at Hong-Kong, in summer, the maximum heat is 94° Fahrenheit, and the minimum 80°, while in winter the thermometer sometimes sinks as low as the freezing-point. At Shanghai the extremes of heat and cold are much greater. Here the thermometer sometimes indicates a temperature of 100° for several days successively in summer, and in winter frequently falls to twelve or twenty degrees below the freezing-point.

MODE OF PREPARING.

I have only prepared black tea, the process being very easy and simple.

The leaves are gathered the day before they are to be dried, and spread thinly over tables to wilt. The small leaves are cured by themselves, as they make the most superior quality of tea. The day after being plucked, they are taken in the hands and rubbed until they become soft and flaccid. They are then placed in heaps and allowed to remain so for about one hour. They are then put into a Dutch oven, which is heated by a few coals under it. While in the

oven they are constantly stirred with the hand to prevent scorching. They are roasted five minutes, taken out, and rolled again upon the table. After being rolled, they are exposed in the open air in the sun, and frequently stirred. While these are out in the air, another set is in the oven. When all have been roasted, those first put out in the air are brought in, and roasted again for five minutes, then taken out and rolled again. They are now placed in a sieve about an inch thick, and held over a few hot coals, stirring all the time. They are then taken out and rolled again. This process of rolling and toasting is continued until the tea assumes a dark color.

After all the leaves have been treated thus, they are put in a basket and hung over a few coals, and frequently stirred until the tea appears black and dry. Mr. Fortune, during his visit to China, "verified the opinion previously formed that black and green teas could be produced from the same plant, and that the dissimilarity of appearance, so far as color is concerned, depended only upon manipulation," green tea being produced by coloring black tea with a powder of three parts Prussian blue and four parts gypsum, applied to the tea during the last process of roasting. I have several times received letters asking if I had the plant for sale from which the green tea was made, and as my authority was not sufficient to convince them that the same plant produces both black and green, I have quoted Mr. Fortune, whose botanical knowledge and learning cannot for one moment be doubted.

Mr. J. W. Pearce, Fayetteville, N. C., says:

Your favor of October 27, in regard to the Chinese tea-plant, was received a few days ago. The original seeds were sent to me, about the year 1860 or 1861, by Hon. Warren Winslow, then member of Congress from this district. I gave the greater part of them to Mr. James M. Smith, a successful horticulturist of this vicinity, and kept the rest myself. We planted them in light sandy land, and they have grown and flourished ever since without any particular attention.

My plants are now about five feet high, and very thick and bushy near the ground, covering a space as large as a molasses-hogshead; have no protection from any kind of weather. The mercury has been as low as 10° below zero. They do not seem to suffer from drought, are ever green, and bear a beautiful white flower, with little scent until nearly ready to fall. The bees are very fond of the flowers. The seed are like the hazel-nut; have a hard shell and a bitter kernel, and take a long time to germinate. Hence it is better to plant them on the north side of a fence or house, where they will remain moist. They come up readily when left under the bushes where they have dropped. The plants can then be set out successfully, care being taken to avoid breaking the long tap-root peculiar to them. My plants have never suffered from insects of any kind. Half a dozen plants furnish my family, of five or six persons, with more tea than we can use. We prepare it by heating the leaves in an oven until wilted, then squeeze them by hand until a juice is expressed from them, then dry them again in the oven. The tea is then quite fragrant and ready for use. It improves by age. We pick the leaves about three times during the year. The younger the leaves the better the tea. I think it will grow in any ordinary soil, clay or sand. The seed should be planted about the month of January.

JAPANESE METHOD OF CULTIVATING AND PREPARING TEA.

Through the courtesy of the Japanese Minister, the Department has been permitted the use of the following translation, made by a member of the Legation, from a Japanese work on the cultivation and preparation of tea:

ON THE QUANTITY OF SEED SOWN.

The best season for sowing the tea-seed is some time in November and December, and also in the early part of spring, when the mercury stands at about fifty degrees, but the earlier it is sown, the better. The first appearance of the new buds will be in the next May, and they grow gradually onward. If the seed is sown during the winter months, it is necessary to pro-

tect it by some means from snow and frost; that sown during the winter months takes root before sprouting, and consequently its growth is more rapid and prosperous. On the contrary, if the seed is planted in the latter part of spring, it cannot take much root, notwithstanding the fertile soil and warmer air of the season. There are two ways for planting the seed, namely, circle planting and straight-line planting.

Direction for the former: Draw straight lines lengthwise upon the ground intended for plantation, two feet apart; and also draw lines perpendicular to and cutting the first-mentioned lines; at the intersection, dig holes about fourteen inches in diameter and two feet deep, and after removing the stones, pebbles, bricks, &c., from the soil, replace the latter in the holes. Then deposit manure upon each of these holes sufficient to cover the surface, and let it remain for one or two days to be absorbed and dried up. After that, drop the seeds around the inner edge of the beds and lightly scatter the soil over the beds about one inch thick. The seeds for one bed number about one hundred.

Directions for the latter mode of planting: Prepare the ground in straight continuous lines about five feet apart (thus allowing some cereals to be sown in between these rows, if desired), and sow two seeds in one spot, leaving a space of two inches between the spots. As the tea-plant cannot bear cold, frosty weather, they must be tended with great care, particularly during the *first* winter. In the first place, to protect them, put one peck or so of rice or wheat husk or some straw around the roots, and scatter dirt to keep it from being blown off by the wind. In some way or other they must be kept from the cold wind, frost, and snow. Sometimes straw, pine or cedar boughs are set around the bushes. Thus keep them until the season of frost is over, say till about the first of April of the next year; and, when the proper time arrives, the wrapping should be taken off, remembering that the same protection is required until the third year.

The use of manure is not particularly needed until after the first year is over; but if at all applied, very weak manure should be used. In the second year a little richer fertilizing is required, say one flour-barrel full of water with half a gallon of manure. In the third year a large quantity of oil-cake is desirable (residue of rape-seed after oil is extracted); if this manure is applied, put about fifty barrels of manure to about one rood, and to obtain the first quality of tea it requires twice as much manure. There are many ways for fertilizing. In some places manure is applied in the month of May, just after plucking off the leaves, when you pour manure-water; and in some places manure is applied in mid-winter, or in the latter part of January. Thus, in one way or another, there are three times for enriching the soil in one year. In some places very weak manure is occasionally used, sometimes oil-cake mixed with manure—seven-tenths of oil-cake with three-tenths of manure. The quantity of manure varies according to the quality of the soil. There is one particular way of applying manure, and it is this: Take a rod or stick and insert it some inches deep in four or five places around each bush, then pour manure into each of the little holes thus made. If manure is applied closely around the plants, it not only does not reach the roots, but destroys the tender leaves.

Great care in manuring is necessary, because the quantity of the new leaves differs according to the proportion of manure and the skillfulness in applying it. One flour-barrel of human excrement should be mixed with two barrels of water. Mix fourteen ounces of oil-cake with twice as much water and let it be in this state about ten days, until it becomes stagnated, and add to it the same quantity of some other stagnated water to moderate it, and even when using this kind of manure the bushes will overgrow and the leaves will wrinkle if the tea-plantation is far off from the human habitation. Sometimes dried fish are used as manure, but this is inferior to oil-cake, and although it will give brilliancy to the leaves, it will also give a darker color and a bad smell.

ON NEW BUDS.

The new buds will gradually shoot out about sixty days after the seeds are planted—that is, when the mercury reaches to about seventy degrees. If the ground is too dry, water should at this time be sprinkled upon the plants. Those sprouting out with a pair of buds are female plants, and the male plant grows singly. They grow about two inches by the next winter; in the second, six; and eight inches in the third winter. In the latter year the taller stems should

be trimmed, while the lower ones should be left to grow, in order to bring them to an equal level; and in the fourth year the same process is also required; but in the fifth year every one of them must be trimmed so as to be of the same height to make the bushes dense and compact.

ON THE PICKING.

The first picking takes place in the third year. In the month of April, when the mercury stands at about sixty-six degrees, shoots come out from the older boughs with about five leaves, and three of these should be plucked off with care, so as not to touch the stalk with the finger-nails. The time for picking the leaves differs according to the temperature of the season; yet the latter part of March, when the mercury may stand about sixty-six, and also about the 10th of May, are considered to be the best seasons.

On their first appearance the sprouts look somewhat like the head of the ordinary writing-brush (Japanese). Two or three leaves will gradually come out, and they will perceptibly grow every day larger, thicker, and more tender, and will have a very fine flavor. This is the very time to pluck them off, and this is known as "two or three leaves plucking." When the picking is delayed till four or five leaves come out the tea loses its flavor, becomes coarser, and will be of inferior quality. During the early part of the season the garden must be watched every day to see whether the time has come or not to pluck the leaves

The larger shoots should be plucked off first, and the younger ones must be left to grow. After the first picking is over some shoots will still come out, and these should be trimmed in order to realize the second crop in due course of time. About thirty days will elapse before the second crop will be ready for picking—say some time in May, when the mercury stands at about seventy-three degrees. After this the stems or stalks should be trimmed so as to make the tops of the bushes level.

Latterly, owing to the increased demand and consequent high prices of tea, the third shoot is also picked; and this is done in June, when the thermometer stands about eighty-four degrees. Thus three crops can be taken annually, but the last plucking materially interferes with the crop of the next year. The first plucking of the new leaves should be done in the third year, as already mentioned. In the sixth year about thirteen ounces of the fresh leaves may be obtained from a single bush. The leaves which have been picked off within ten days from the commencement of the season (the latter part of April, when the mercury stands at about sixty-six) are known as the first class in quality, and those taken off about fifteen days afterward, the second class. The quantity of one day's yield, for a female laborer, is from ten and a half pounds to thirteen. The best hours for this labor are from early morning until 2 o'clock p. m., and the leaves which may have been picked off after that hour should be cured on the following day. The proper way for keeping them through the night is to spread them on the mats, and keep them outside, if the weather be not very damp. This is done to keep the leaves from shrinking too rapidly. But, if the weather is damp they must be spread under shelter so constructed as to admit a free circulation of air.

ON THE CURING.

The leaves are now carried in from the field; and by means of sieves the two small bracts attached to every stem, and broken or fragmental leaves, must be separated from the good and whole leaves. The old leaves, sticks, &c., should also be carefully separated from the good leaves. It is always the best way to prepare the leaves on the same day they are picked; for, if kept through the night, their quality is somewhat impaired; if two nights be allowed, they will lose much of their flavor; therefore, the quantity to be picked must be calculated according to the number of hands and heaters (or hoiro, a utensil made of thick paper, with frames, for the purpose of heating the leaves). The fire-place must be built large enough for a boiler about two feet in diameter; fill this boiler with eight-tenths of water, and boil it until it reaches two hundred and twelve degrees. When the steam rises, a square piece of cedar-board with a large hole in the center is fixed on the boiler. On this board, and around the outer edge of the circle, is placed a circular mat, made of rice-straw, to prevent the steam from escaping, and on this mat is placed the steamer.

Then about half a pound of the green leaves are put in the steamer and covered. After thirty seconds the cover is taken off and the leaves are stirred up by means of small wooden sticks, made of *Paulownia imperialis*. The same process is repeated thirty seconds afterward. The leaves soon become adhesive, and have a tendency somewhat to cling to the sticks; and this is a sign that the steaming is done. This is the time to take them aside and put them in a cooler place, and this is done by turning the box upside down, as the steamer, which is on the bottom of the box, will come out at the upper part. Then spread the leaves, cooling them with fans, and after they become cool enough put them into baskets, and get them ready to be sent to the heating department.

ON HEATING.

In heating, a place must be arranged three feet wide, six feet long, and about three feet high, plastered inside and out with mud. Burn in the furnace about twenty pounds of oak-wood charcoal. When the fire becomes hot, put in two or three bundles of straw in order to make the heat softer; then put iron bars across the furnace and the copper-wire nets over the bars, and spread the heater (of thick paper) which is made to fit the place. Four pounds of the steamed leaves may then be scattered on the paper; rub them very softly with both hands; winnow or throw them very lightly, and stir them. This ought to be skillfully performed, so that the proper color and flavor may be secured. Then they must be taken aside at the moment when they are almost dry. When the day's work is over, take the fire out from the furnace, and prepare as was done before; then scatter the leaves which were heated during the day, drying them in this way during the night. At this time about twenty-four pounds may be spread over, but it requires great experience to heat them in this way. The softer heat is preferred to the greater heat. The quantity of the best tea which may be prepared by one laborer per day is about thirty pounds on an average; and the quantity of the inferior quality, from twenty-eight to thirty-seven pounds. About one pound and three-fourths of tea is generally made out of eight pounds and five ounces of the green leaves.

THE FINISHING PROCESS.

For this purpose a sieve should be used, in which the dried tea is to be softly rubbed by the palms of the hands, separating the tea from the stems. The next process is to separate the tea from dust, sticks, stems, &c., by winnowing; and if this is difficult to do, put them on a stand, and sort them into two or three classes, and then use a finer sieve. After this has been done five or six times, separate the larger leaves from the others, and so on with the finer leaves.

Numbers 2,* 3, and 4 of the sieves are used for the inferior tea, shaking the leaves through two or three times. The sieves numbered 4 and 5 are required for a second class tea, and it must be passed through them twice. For first-class tea, the sieves numbered 3, 4, and 5 are used, respectively, and then it must be passed twice through No. 6. Sieve No. 1 is only used for a very common tea, and Nos. 7, 8, 9, and 10 are used for extra fine quality.

* Sieve No. 2 is 2 feet and 2 inches in diameter, arranged with eye-holes three-tenths of an inch square, made of split bamboo one-tenth of an inch wide. No. 3 sieve is 2 feet and 1 inch in diameter, with eye-holes one-fifth of an inch square. No. 4 sieve is 2 feet in diameter, with eye-holes two-tenths of an inch square. No. 5 sieve is 1 foot and 9 inches in diameter, with eye-holes one-tenth of an inch square. No. 6 sieve is 1 foot and 8 inches in diameter, with eyes five-tenth inches square. The depth of these sieves should be about 3¾ inches.

COFFEE: THE POSSIBILITIES OF ITS CULTIVATION IN THE UNITED STATES.

The conditions of latitude, climate, and soil of a portion of the United States lead to the conclusion that the coffee-plant, or tree, can be cultivated to some extent in this country with successful results.

It is a fact worthy of consideration that from various causes there has been considerable falling off in late years in the production of coffee in the different parts of the world, and if it could be demonstrated that portions of the United States are in every way adapted to its cultivation, the advantages to accrue from it are too manifest to require further mention.

The total importation of coffee into the United States for the year 1876 amounted to 339,789,246 pounds, and cost the people of the United States the sum of $56,788,997.

It has been established by the best authorities on the subject that great warmth of climate is not absolutely essential to the growth of the coffee-plant, but a climate characterized by neither extreme heat nor cold, but possessing a fair amount of humidity.

The climate and soil of Florida, there is every reason to believe, would answer these conditions. So it is also with Lower California and a portion of Texas. This belief is rendered almost a certainty by the authentic statements that in these regions, at least in Florida and California, there is found growing in abundance a wild coffee with many of the characteristics of the cultivated plant.

In California the experiment has been tried of planting the berry of coffee obtained from Costa Rica, and the results reported as satisfactory, and without any special care or skill in its cultivation.

The coffee of commerce comes chiefly from Brazil, Venezuela, Hayti, the British and Dutch East Indies, the West Indies, and Mexico.

The plant (*Caffea arabica*) is a tree from eight to twelve feet in height, sometimes attaining a height of twenty and thirty feet. When cultivated, its upward growth is checked by topping, for convenience of gathering the fruit. The plants are grown from seed in nurseries, and when a year old are set out. They are in full bearing the third year, and continue so for twenty years or longer, if properly attended to.

The plant is an evergreen. While it is cultivated throughout the tropics, it is a native of the mountainous regions of Abyssinia, and derives its name from Caffa, one of the provinces of that country. From Abyssinia it was introduced into Arabia, and for a long time Arabia supplied all the coffee that was then

used. Some time in the seventeenth century it was introduced into Batavia and Surinam, and thence into the Western Hemisphere.

The fruit of the coffee-tree, the coffee-berry, resembles, when ripe, the common cherry. Each berry contains two seeds, which are the coffee of commerce. Their flat sides lie opposed to each other in the center of the pulp, and are separated by a thin layer of this, and by a tough membrane which closely envelops them. When dried this pulp or cherry becomes a sort of pod, which is removed by means of a mill and a winnowing-machine. They are picked from the tree by hand, or if allowed to remain until ready to fall, are shaken off upon cloths placed on the ground to receive them.

The shrub is planted in warm situations, generally on the slopes of hills, and in soil which does not retain the rains which fall on it.

It is usual to plant about nine hundred trees to the acre, and the yield of a good season, and of this number of trees in full bearing, is about two thousand pounds of coffee.

The Department proposes to further investigate the conditions of soil and climate essential to the growth of the coffee-plant, and its adaptability to portions of the United States, and respectfully requests any information or suggestions in regard to the same.